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PATENT SPECIFICATION

(11) 1 257 777

DRAWINGS ATTACHED

(21) Application No. 55535/67 (22) Filed 20 Dec. 1967

(23) Complete Specification filed 19 March 1969

(45) Complete Specification published 22 Dec. 1971

(51) International Classification B 23 b 31/04

(52) Index at acceptance

B3B 2A1 2G 2K4 2K6 2K8 2K9 2L 2Y2A5

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(54) IMPROVEMENTS IN OR RELATING TO CHUCKS

(71) We, CLARE COLLETS LIMITED, a British Company, of Wright Street, Broadheath, Altrincham, Cheshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method which which it is to be performed, to be particularly, described in and by the following statement:—

This invention relates to chucks for drills, reamers, milling cutters and similar cutting tools.

As is well known, it is necessary to adjust the projected length of a cutter held in a chuck to compensate for wear, and it is an object of the present invention to provide a chuck which incorporates a simple and efficient means for adjusting the said projected length.

According to the present invention there is provided a chuck for a cutting tool, comprising a body, a collet mounted in said body and into which the shank of a cutter can be engaged, a coupling engageable with the collet and the body to lock a cutter in position in the collet and an adjustable element disposed rearwardly of the collet and engageable by the shank of a cutter held in the collet, the adjustable element and the collet being provided with male and female configurations adapted to co-operate in the assembled chuck to prevent relative rotation and are united in the assembled chuck by an internally screw-threaded ring adapted to engage screw-threads of opposite hand on the collet and adjustable element whereby rotation of the ring in one direction moves the adjustable element towards the collet to advance the cutter and rotation of the ring in the opposite direction moves the adjustable element away from the collet to retract the cutter.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is an exploded, part-sectional perspective view of a preferred embodiment of a chuck in accordance with the invention; and,

Fig. 2 is a plan view of the collet of the chuck shown in Fig. 1.

Referring to Figs. 1 and 2 of the drawings, a chuck in accordance with the invention comprises a collet 1 into which the shank of a cutter (not shown) can be engaged, a coupling in the form of a sleeve or collar 2, an adjustable latch element 3, a locking ring 4 which locks the latch element 3 to the rear portion of the collet and an internally bored chuck body 5 in which the items 1, 4 and 3 are held as a unit by the collar 2.

The circular section, tapered collet 1 is formed with four radial slits 11 spaced mutually at right angles, one of which extends into a central bore 12 in which the cutter shank is engaged. The slits 11 extend axially from front to rear of the collet 1 (left to right in Fig. 1) and two diametrically opposed slits open out into two slots 13 (Fig. 2) which extend radially from the bore 12 and axially to the rear of the collet. A front portion 14 of the collet 1 is of reduced diameter and screw-threaded for engagement by the collar 2. A rear portion 15 of the collet 1 is of further reduced diameter and has an external right-hand screw-thread for engagement by the locking ring 4 as will be described.

The latch element 3 is of generally cylindrical shape, comprising a front portion 31 of reduced diameter with a rectangular section bore 32 which receives the tang of the cutter and which is flanked by two dogs 33 which, in the assembled chuck, engage in the slots 13 of the collet 1 to couple the latch element and collet against relative rotation. The middle and rear portions, 34 and 35 respectively, have a cylindrical bore and the former has an external, left-hand screw-thread for engagement by the locking ring 4.

The latch element 3 and the collet 1 are united by the locking ring 4 which is provided on its inner surface adjacent its right-hand edge with a left-hand screw-thread 41

and adjacent its left-hand edge with a right-hand screw-thread 42. These screwthreads engage respectively with the left-hand thread on the mid-portion 34 of the latch element 3 and with the right-hand thread on the rear portion 15 of the collet 1 so as to interconnect the collet and the latch element, which are already coupled by the engagement of the dogs 33 of the latch element with the slots 13 of the collet 1, in such a way that if the ring 4 is rotated in one direction the latch element and collet will separate while if the ring is turned in the opposite direction the latch element and collet move together.

The unit consisting of the collet 1 and the latch element 3, interconnected by the ring 4, is received in the blind bore 51 of the chuck body 5. The initial part of the bore 51 is tapered to conform to the taper of the collet 1 and the body 5, in this region is formed with an external screw-thread 52 which is of different pitch to the screw-thread on the front portion 14 of the collet 1.

The unit is firmly held in the bore 51 by the collar 2 which has an internally screw-threaded front portion 21 of reduced internal diameter and an internally screw-threaded rear portion 22 which screw-engage to the front portion 14 of the collet 1 and the body 5 respectively. Due to the difference in pitch of the screw-threading on the front portion 14 of the collet 1 and on the body 5, rotation of the collar 2 effects a differential action between the collet 1 and chuck body which causes a strong binding action on the collet when in use. To facilitate its removal from the chuck body, the collar 2 is provided on its circumferential surface with flats 23 for engagement by a wrench.

When a cutter held in the above-described chuck shows signs of wear, an axial adjustment of the cutter is effected to compensate for same by releasing the collar 2, removing the three-part unit from the bore 51 of the chuck body 5, rotating the locking ring 4 to bring the latch element 3 holding the tang end of the cutter towards the collet 1 thereby advancing the cutter with respect to the collet, replacing the unit in the chuck body 5 and screwing the collar 2 back onto the collet and chuck body. Of course, if, for any reason, it is desired to withdraw rather than advance the cutter, the above operations will be identical save that the ring 4 will be rotated in the reverse direction.

A graduated scale (not shown) may be provided at a suitable place in the collet and latch element unit to indicate the extent of adjustment.

It will be appreciated that numerous modifications may be made to the embodiment described without departing from the scope of the invention as defined in the appended claims. In particular, some modification in internal shape of the components will be dictated by the type of cutter employed, i.e. whether this has screw-threaded, plain or other shank constructions.

WHAT WE CLAIM IS:—

1. A chuck for a cutting tool, comprising a body, a collet mounted in said body and into which the shank of a cutter can be engaged, a coupling engageable with the collet and the body to lock a cutter in position in the collet and an adjustable element disposed rearwardly of the collet and engageable by the shank of a cutter held in the collet the adjustable element and the collet being provided with male and female configurations adapted to co-operate in the assembled chuck to prevent relative rotation and are united in the assembled chuck by an internally screw-threaded ring adapted to engage screw-threads of opposite hand on the collet and adjustable element whereby rotation of the ring in one direction moves the adjustable element towards the collet to advance the cutter and rotation of the ring in the opposite direction moves the adjustable element away from the collet to retract the cutter.

2. A chuck as claimed in claim 1, wherein the adjustable element is provided with a pair of dogs engageable in corresponding slots in the collet to prevent relative rotation of the collet and adjustable element in the assembled chuck.

3. A chuck as claimed in claim 1 or 2, wherein the coupling has front and rear screw-threads of different pitch engageable respectively with corresponding screw-threads on the front of the collet and of the chuck body.

4. A chuck as claimed in any one of the preceding claims wherein means are provided for indicating the extent of cutter adjustment.

5. A chuck for a cutting tool, substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1971.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

1257777 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

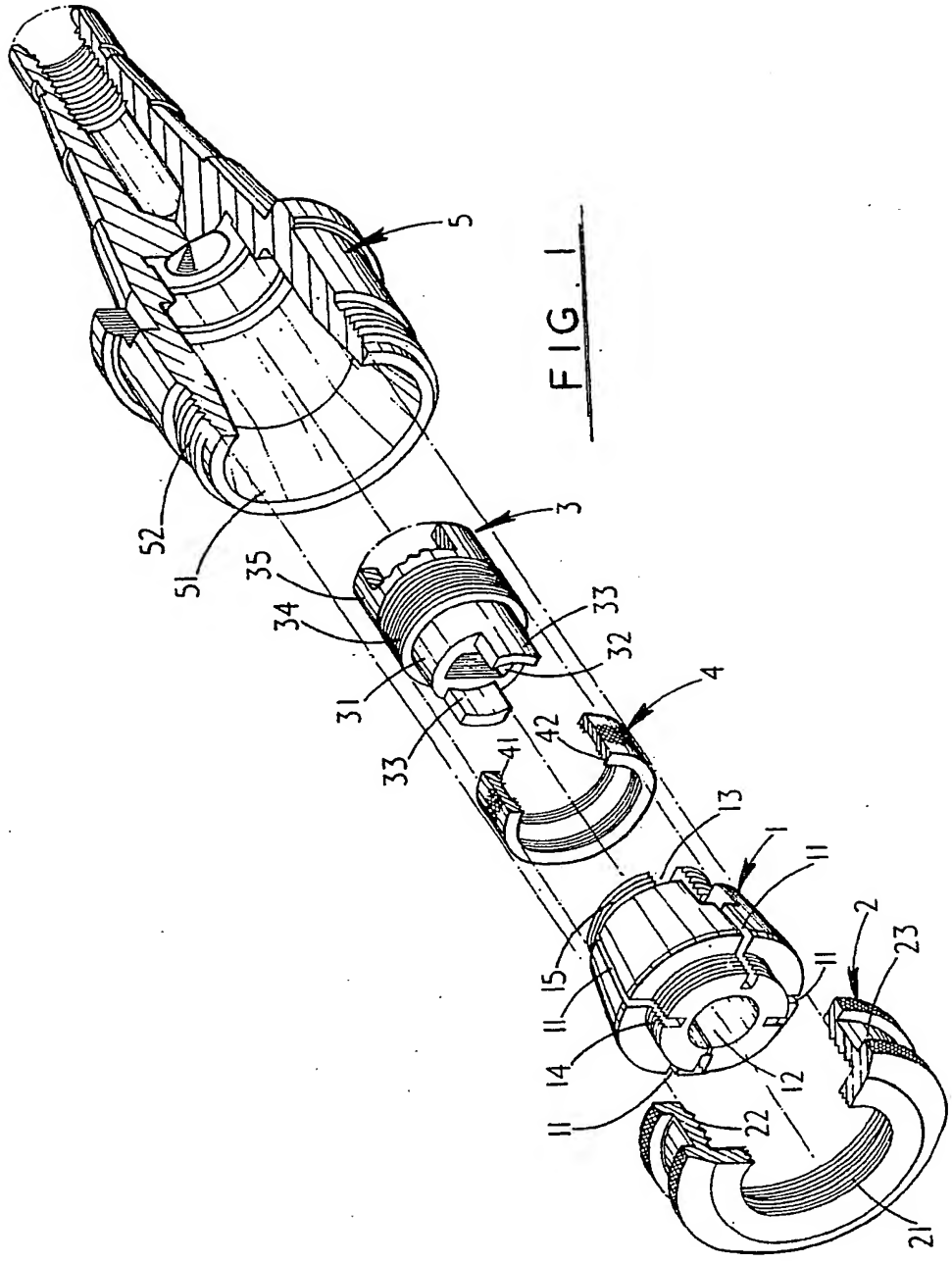

FIG. 1

1257777 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale.*

Sheet 2

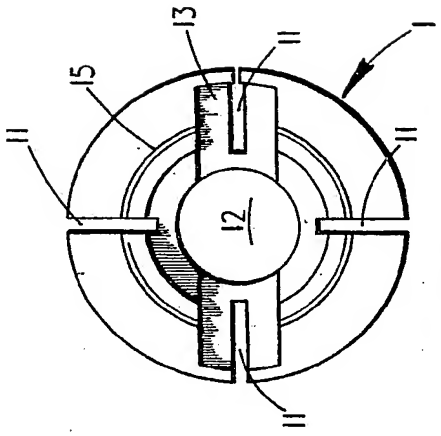

FIG. 2